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V.—THE PSYCHOLOGICAL BASIS OF PHONETIC LAW AND ANALOGY.

“All’s love, yet all’s law.”—Browning, *Saul* XVII.

The subject of Phonetic Law and Analogy belongs to Psychology as well as to Philology ; it originated, however, and was for a long time kept within the domain of the latter discipline. When it first came into the foreground of our interest, it was agitated by scholars in historical philology. The experience of daily linguistic research suggested both the question and the answer, and in fact the main importance of the whole problem was seen in the influence which its solution must have upon the methods of detailed investigation.

Do phonetic laws act with absolute consistency or not? and how far may analogy be recognized as an agency in language-life? These were the points at issue. In a general way it was a movement from casualty to causality. To say that any one man started this movement a few years before or during the decade from 1870 to 1880 would be unfair. There is an uninterrupted course of development from Schleicher to Brugmann, from Whitney to Paul. On the other hand, however, it would be equally unfair not to grant that during the time mentioned a vague impression, a sub-conscious motive, evolved into the clear statement and the strict observance of a principle.

The fact had been recognized, that the Aryan mother-tongue was a language with fully developed inflections long before it split into its various idioms. Then, however, the so-called Indo-European roots could be no longer considered as realities ; they were henceforth grammatical abstractions and convenient formulas. The mechanical dissection of individual words could no longer be applied to languages which had inherited these words as ready-made units, but each single word-form

must be judged as a whole in connection with and in the light of related forms. It was seen—and this view was especially suggested by the observation of living dialects—that grammatical systems as those of declensions or conjugations, were apt to mould the shape of any individual member of the system. Thus the principle of analogy found its way into philology. Thereby a number of phonetic laws appeared to be relieved of what so far had seemed to be exceptions, and this finally led to the conclusion that phonetic laws suffer no exception whatever, and that all deviating formations must be due to outside influence, to analogy. The representative men during this period of evolution are Schleicher, Curtius, Whitney, Ascoli, Scherer, and Leskien. Each of them contributed a large share towards the final result. Leskien especially emphasized the new ideas in theory and practice. In his academic lectures at Leipzig he inspired a number of pupils who were soon to develop his teachings into a code which must henceforth be observed in all philological work. They insisted with ever-increasing energy upon the necessity of adherence to laws and upon the all-pervading influence of analogy. At first their statements were still of a confessedly dogmatic character. They only claimed for their views the value of an unproved but plausible theory; in the absence of real arguments, they appealed to the self-respect of philologists and enlisted the dignity of their science in behalf of their doctrine. Gradually, however, they became more and more aggressive; in the preface to their *Morphologische Untersuchungen* 1878, Osthoff and Brugmann published a “confession of faith” demanding adherence and scorning opposition. In turn the new theory was called a fad (Modethorheit), it met with ridicule, and worse than that, with much passive resistance. But soon the “aperçu” was supported by proof. It was the principle of analogy that first came to be well understood, and was explained by Paul, in the fourth volume of his and Braune’s *Beiträge*.

The consistency of phonetic laws still remained a matter of personal impression. Neither the inductive nor the deductive method yielded conclusive arguments. In 1878 Osthoff made a somewhat premature attempt to present the subject before a larger public. He gathered the inductive evidence so well that almost nothing new has since been adduced; but it all pointed only at a probability. On the deductive side, Osthoff utterly failed. It must even be said that in ascribing a decisive influence to climatic conditions he made a step backwards. That theory had been sufficiently exposed by Whitney. Osthoff's fatal mistake lay in his neglect of the psychological element in phonetic transitions. Misled, perhaps, by the growing importance of speech-physiology—Phonetics—he saw one-sidedly in phonetic laws the work of the nerve-muscle apparatus only. Here again, as in the case of analogy, the first true light came from Paul. In his *Principien der Sprachgeschichte*, 1880, the whole phenomenon of speech was first treated on its proper ground, namely upon the basis of philological experience combined with a serious study of modern psychology and an exact knowledge of the physiological genesis of speech-sounds. Through Paul's thoroughgoing investigations our insight into the true nature of Language has been much deepened; based, as they were, upon a close observation of reality, they did away with many old prejudices and misleading abstractions. As Whitney's linguistic publications are of a distinctly different character, it is no injustice to our sound and sober Yale philologist to say, that Paul's work was epochmaking in regard to the study of every aspect of language life which it touched. Not that in it all riddles were solved; but every problem was defined, reduced to its real nature and prepared for solution, if not solved. A solid ground was now gained for further discussion; the dogmatic tone ceased on both sides, and soon a number of fruitful essays appeared, throwing more and more light upon the various sides of our problem. The men who took a prominent part in the discussion are Delbrück, Tobler,

Neumann, Misteli, Jespersen, Brugmann, Gröber, Wundt, Schuchardt, Kauffmann. In America some phases of our subject have been treated by Bloomfield, Easton, Goebel, Tarbell, Wheeler and the author. In the meantime, however, one important piece of inductive evidence had also been obtained in favor of the law-theory—an argument which Osthoff was hardly in a position to quote—that is the enormous gain which has come to philology through the new dogma as applied by the “neogrammarians” themselves and by those who sooner or later adopted the same method in practice, though not always in theory. Not only has the philological work of Osthoff and Brugmann, of Braune, Paul, Sievers, of Bechtel, Collitz, Schmidt, Kluge, Noreen, Neumann, Meyer-Lübke, Schuchardt,¹ and others developed exceedingly clear and lasting results, but theirs has practically become the working method of all philologists; nobody would to-day simply register an exception to a rule without making an attempt to account for the same. Some philologists even seem to have already forgotten that there ever was any question about the consistency of phonetic laws. In fact the problem is now more especially a psychological one; it has largely lost its methodological interest, while the solution itself is still a matter of controversy and while a few may even go so far as to deny both the truth and the novelty of the law-theory. Its most successful opponent is undoubtedly Schuchardt. In an admirable pamphlet and in several articles in the *Literaturblatt* he has indeed shown that some of the fundamental assumptions in Paul’s argumentation are untenable.

In now discussing the subject itself we think it advisable to present our own views and observations somewhat explicitly rather than to offer a disconnected criticism of individual arguments. In this way we shall have to repeat many things that have already been said by others, especially by our revered

¹ This list is not meant to be exhaustive or representative; it suggested itself to the author at random, merely on the ground of his own studies.

teacher Paul, but, in turn, the points in which we differ from our predecessors will thus stand out in their true light and, moreover, we hope to give such a presentation of our subject as will be readily understood by those who may not, as yet, have paid attention to this important question. First of all, let us see what are the undisputed facts which historical philology teaches us concerning the effects of phonetic changes and of Analogy upon the spoken language-material.

Strictly phonetic changes, that is, changes which seem to affect the sounds of a language regardless of the meaning of the words in which they occur, usually cause a slow graduation of one sound or group into another, and the change of a sound in any one word is, as a rule, accompanied by a parallel change in a number of other words. A closer examination usually enables us to ascertain the circumference of such a change by stating the phonetic conditions under which the transition took place. To be sure we can never with certainty predict the change in any one word. We are strictly limited to a *posteriori* statements, and if we call our abstractions a rule or law, we must not forget that the speech-material will fit into our rule only in so far as our rule has been made to fit the speech-material. The fact, nevertheless, remains of importance, that phonetic changes usually affect a sound in whole groups of words.

Analogy, as the word is most commonly used in philology, seems to operate primarily with larger speech-units, with words and word-elements not only as phonetic productions, but also as expressive of their respective meanings. Through the medium of the word-element analogy influences the sounds of the word; it causes not a gradual transition of sounds, but it may bring about a substitution of word-elements, and its work in any one case does not immediately seem to involve a change of any other word.—It now becomes our object to find out, how and why both these factors come to manifest themselves in Language, and in order to answer this question, we should realize exactly what Language indeed is. We must study the result,

the spoken word in Phonetics and historical philology, and the subject, speaking man, his physiology and psychology, in order to understand the act of speech.

Human language is our agency of expression and of inter-communication by means of sounds that are produced by the vocal organs. Through various motions of our glottis, our palate, tongue and lips, the air from the lungs is forced into different vibrations which strike the ear of the hearer as sounds. A word then, in so far as it consists of sounds, is merely a series of vibrations which touch our ear for a moment, then radiate and, as sounds, die away ; it is the transient result of an action, it has no duration, yet it has its causes in the past and its consequences in the future. That same word has been pronounced before ; we may recognize it ; it was intended by the speaker to indicate something to us, and it does so ; we may reproduce it on our part for the same purpose. What then is going on in us that enables us to recognize a word and to understand its meaning, to recall it again, and to reproduce it ? Reviewing the elements of psychology we remember that the sensory nervous system with its centre in the brain and with its functions differentiated into several more or less distinct branches is the channel through which man receives and realizes the influx of impressions from the world around him. All these branches with their innumerable fibres are constantly at work and simultaneously conduct their impressions to the central organ, like so many reporters who are constantly wiring from various places at the same time their experiences to the central office. These reports are recorded and preserved ;¹ they may and they do drop into unconsciousness ; the vast majority of them never become conscious at all ; yet they all have their influence upon the individual ; favorable circumstances may call or recall them into consciousness or into a state of more

¹ Little is known, as yet, about the real nature of this process, and if in the following lines we use expressions like "impress, imprint, deep" etc., we are merely using figures of speech which are not meant to contain any intimation as to the way in which our mental activity is carried on.

or less vivid and active subconsciousness. The latter is sufficient for the purposes of speech, it is indeed the very province within which the function of speech lies. The central point, the "Blickpunkt" of consciousness is occupied by the idea to be expressed, while the act of speaking is performed on the very edge of the wider sphere, the "Blickfeld" of consciousness, and partly, so far as the mechanical execution is concerned, within the realm of unconsciousness.¹

Now the readiness with which a sensation or perception may come into consciousness, or into what we may call cooperative subconsciousness, is determined by various circumstances: by the condition of our mind, its momentary susceptibility as well as the direction of its main attention, and by the nature of the impression itself, its absolute energy as well as the number of times the impress is repeated. Upon all these factors depends the facility with which the mechanical retention of impressions, the general faculty of memory—"Gedächtniss"—can lead to the recalling—"Erinnerung"—of individual impressions. Among these arguments there is one which calls for further explanation, as it is of extreme importance in speech, and at first sight not self-evident. Namely, how can repetition take place in such a way that the new impression fits into, and renews or strengthens the memory picture of a previous impression, when in reality, considering the incessant change of subject and object, no two impressions can ever be perfectly equal? They can indeed only be more or less similar to each other, but they are nevertheless connected in our mind, and for this reason: similarity means, of course, partial equality, equality of parts, and the apperception of equal impressions into the same memory-picture naturally involves the merging into one another of the corresponding equal parts of two similar impressions. Of two perceptions, the one may cover the province of $A + B$, the other that of $A + C$; then the A

¹This does not preclude the possibility of conscious interference with the development of words. That factor may have to be considered in a study of results, but the usual psychological phenomena are not thereby altered.

of the second will be apperceived into the memory picture of A of the first impression; united A being imprinted twice, may thereby stand out more vividly even, than either B or C. At the same time united A will act as connecting link between $A + B$ and $A + C$. The phenomenon of apperception thus immediately leads to that of association, and it is obvious that an association will be more or less intimate in proportion as the equal connecting or the unequal connected parts prevail. Practically, now, extreme similarity has the same effect upon our mind as perfect equality: the impressions cover each other completely and the composite result is simply a strengthening of the old memory-picture. This is due to two circumstances: namely, subtle as our nerve-brain apparatus may be, it is not absolutely perfect. There is a threshold of sensitiveness; minute impressions are not recorded; they are lost in the apparatus. Hence the element of personal error in all perceptions. This comparative dullness of our nervous system, of course, accounts only for the mere *possibility* of similar impressions being recorded as equal, while it would not preclude the opposite occurrence, namely, the deviating of two perceptions from each other beyond the actual difference. However, as a very important fact in this connection, it has been recently ascertained,¹ that in every new perception the element of personal error tends to work in the direction towards a previous, accustomed memory-picture. Through the habit of apperception and association we seem to have acquired a tendency to emphasize equalities, to neglect differences, to allow an old memory-picture to immediately over-shadow a new perception, so that we do not realize the actual difference between the old and the new. It is this fact, then, which causes extreme similarity to appear as equality, the minute differences remaining unrecorded. Of course, as the actual discrepancy between similar impressions increases, it will make itself felt more and more distinctly in the composite impress.

¹ Cf. Leuba in *Clark University Minor Studies in Psychology*, I.

The latter will then unconsciously, or more or less consciously deviate from the previous imprint. As long as the element of equality by far prevails, the congruous parts, having the advantage of repetition, will alone constitute our clear conception, while the deviating elements largely remain unconscious, or form about our conceptions a circle of vague suggestiveness. On the other hand, impressions which have only small and insignificant parts in common and which are essentially different from each other will overlap but little, being in the main registered separately. Such perceptions may be so loosely associated with each other that they need especially favorable circumstances for calling each other up at all. Here belongs the peculiarly complicated yet loose connection which exists between the simultaneous impressions of the different senses. They have in common the element of time, that means, of surrounding, the general condition ("Gemeingefühl") of the individual. They are indeed altogether a physiological unit, because the various sensory centres are, of course, directly and indirectly connected among each other in the individual.¹

Yet the unit is—as in the case of most perceptions and sensations—distinctly a complex one, and experience shows that the different constituents, as they are introduced by the various channels of the nervous system, only connect very loosely with each other. A sight-picture does not normally impart any distinct impression to the acoustic centre. Indeed

¹ In fact from a physiological as well as a historical point of view, there is in man a double connection between the seats of the various senses: the one, of a higher order, located mainly in the cortex in which all the centripetal and centrifugal nerves are combined into a more or less self-conscious unit; this is best developed and capable of highest perfection in man, diminishing and graduating away in the lower animals;—the other, located in the lower parts of the brain, the cerebellum and the medulla, the province of reflex actions between the different branches of the system; this interrelation is stronger and more depended upon in the lower animals than in the more developed ones; it is evidently the remnant of the original uniformity of the whole nervous system.

the main effect of one sensory centre upon the others seems¹ to consist in a general agitation through the whole system, arousing or dulling it into a certain state of susceptibility. Thence it comes that when one of the parts of such a simultaneous impression is in the future repeated, it does not necessarily call up again the whole previous group. The connecting element is not strong enough to link the different parts immediately together; yet the oftener the latter are introduced together, the prompter and the more unfailingly will the connection work—it is strengthened by repetition.—This observation finds its reflex in the physiological fact, that when through a lesion of the brain the usual path between two parts is destroyed, and a new connection is formed, the new line will at first conduct only imperfectly, but through habit the transmission becomes more and more correct and prompt.

With these premises we shall readily understand two phases of language-learning, that of remembering and of understanding words.—The child hears the word *mama* while its eyes reflect the features of the mother and while through her care it is being made comfortable and happy. That means, at the central organ a group of simultaneous reports are received: there is the sound-picture of the word *mama*, there is the sight picture of the mother's features, and there are, through various other channels, reports of pleasant sensations. The sound-picture *mama* is thus connected with the remainder of the group. Now the situation passes by, the associated impressions

¹ This question, like many others relating to the working of the nervous system and the brain, is yet far from being settled. Numerous cases are on record of a very distinct and immediate inter-relation between the different senses. The author can here speak from his own experience; the vowel sounds most vividly suggest to him colors and *vice versa*: a = red, o = blue, e = green, ä = yellow, i = white, u = purple-black, etc. Our languages abound in precipitates of such and similar connections: loud colors, soft sounds, etc., etc.—But however immediate, unavoidable, and natural, such mutual interrelations may appear to us, it seems difficult to prove, that they are not the result of early associations brought about by personal experience of the individual or of his ancestors.—Yet see now *Krohn*, "Pseudo-Chromesthesia," *Am. Jour. of Psychology*, V, pp. 20-42.

drop into unconsciousness and there they remain, as memory pictures. The following times, whenever the word *mama* is heard, the situation again includes the shape of the mother and, besides, usually a number of pleasurable sensations. The latter, though mostly pleasant will, however, vary greatly in detail, while the sight-picture of the mother and the sound-picture of *mama* mostly form a part of the group. These two most stable elements form thus the most distinct impressions and are preeminently connected with each other: the word *mama* finally means nothing else distinctly but the mother, while all the other impressions oscillate about the sight- and sound-pictures, uniting what they have in common, and thus surround the word *mama* or *mother* with that halo of sacred sweetness which it possesses everywhere. In this way the sound-picture of every word is fixed in our memory, receives its distinct meaning and also, to a large extent at least, its collateral associations, its suggestiveness and general character, or what might be called its topographical place in the individual's vocabulary. This process is fundamentally the same everywhere: in the child, when it learns its first words from parents and servants, in the youth, when taught to accelerate the acquisition of new material by paying special attention to his language, in the foreigner who tries to learn something from everybody, in all men as they are gaining a fuller and more correct use of their mother-tongue. There is no reason to believe that the process was essentially different at the time when human language was in its first formative period.

Our next question is, how do we learn to pronounce and to use words correctly? Bearing in mind that we do not speak here of the first origin of speech, but of the normal nature of an already existing language, we will first recall the fact, emphasized by Whitney, that we must hear a word from others, before we can think of pronouncing it ourselves; hearing precedes and elicits speaking; the first foundation of our vocabulary consists of words whose sound-pictures we have already developed in our memory. We reproduce these words

as we heard them ; we imitate. The kind of imitative reproduction however, is of a somewhat complex nature. We have only the final aim, the result to guide us, while we know next to nothing about the way in which this result was and can again be obtained. We cannot see the motions of the vocal organs in other persons clearly enough to be guided by them ; nor have we control enough over our own organs, consciously to repeat the motions of others, even if we could see them. How, then, does the child contrive to pronounce any given word for the first time ? Indeed another question would first arise. What is it that induces the child to use its vocal apparatus at all ? We can only state the fact that children can and do cry almost before they can perform any other motion. That means, they inherit a predisposition to produce sounds with their vocal organs ; the motory nerves which control the latter respond easily to every sensation that is reported at the central organ. Therefore whatever agitation may be felt anywhere in the nervous system, it is especially the vocal apparatus that is set in motion, to restore the equilibrium. Moreover, there seems to be an especially close correspondence between the motory nerves of the vocal organs and the sensory acoustic centres ; the former are called upon to react, as soon as an idea agitates the child's mind and in connection with it the sound picture of a word arises. As the eye governs the hand, thus the ear controls the vocal apparatus. The tendency, at least, to develop this interrelation is also inherited and thus far may it be said that Language is natural to man.

But what enables the child to move its vocal organs in the right way so as to reproduce a certain sound ? This ability must be acquired by each individual through practice, just as the execution of almost every motion must be learned. Yet the child undergoes a good deal of preparation for its first task. Long before it tries to reproduce any one word, it has been uttering many different sounds and sound-groups at hazard, without any purpose but that of motion as an outlet of agitation. Of course, it has at the same time been hearing the

phonetic effects of those motions, its own cries and sounds. An association, an unconscious grouping has taken place between the various sounds and the sensation of the muscular motions that produced the former. The child says many times *ma, ma, ma, papapa* before it notices that *mama, papa* have any meaning. These first sounds are caught up by the parents, they are repeated and interpreted as *mama, papa*—in fact, these words, most likely, owe their origin to baby-talk. Now the child hears his own *mamama* repeated as *mama*, he gradually—as we saw above—connects the word with its meaning and thus it is that when he first wishes to say *mama*, the way is prepared, the vocal organs move about in the right way, because the sensation of the required motion is already developed. The scope of phonetic acquisitions is thus gradually enlarged, until all the sounds of the mother tongue are at his disposal. To be sure, none of the first reproductions of a word are entirely successful; many attempts may be necessary, before the resulting sound is in harmony with the sound picture in the speaker's mind. Little by little, however, the motion and the sensation of motion adapt themselves and become so familiar, the connection between the idea, the sound-picture, the sensation and the execution of the motion, becomes so perfect, that the conception is expressed by the pronounced word with a promptness which approaches the immediateness of a reflex motion.¹

There are other factors of importance for the development of speech, we may mention especially the motive of sympathy on the part of the hearer;² but what has been said, will be sufficient—as it was necessary—to help us to understand our

¹ In this connection we mention the controversy, if such it may be called, between Max Müller and Whitney. Max Müller has published and republished large volumes in which he assumes and tries to prove that Language and Thought are identical; Whitney has several times taken occasion to expose the absurdity of this assertion, but apparently without any effect upon Müller whose recent publications still essentially repeat the fundamental errors of the first editions.

² Cp. Wegener, *Grundfragen*, pp. 13 and 66.

special subject. It appears that it is not the spoken word that changes, but the acoustic picture in our mind through its transmission from one individual to the other. Treating now first the especially so-called phonetic changes, it is clear that the very act of speaking involves the possibility and the necessity of change. We saw how Language must be gradually acquired and, of course, the process of learning which goes on throughout life suggests all imaginable phases of development, from the first uncertain attempts of the child to the high degree of perfection which the trained and refined man may obtain. When we further consider that men are not all equally gifted and have not all equal opportunities, we at once understand that there must be an infinite number of speech varieties in existence all the time. Accurately speaking, there are as many different varieties as there are persons speaking and even the language of every individual may be subdivided into different kinds of speech according to the mental condition of the speaker and the social atmosphere in which he is moving at the time. All these speech varieties are constantly influencing each other. Even a pronunciation noticeably different from our own and one which we subconsciously feel to be less perfect will affect our own speech as long as the sound pictures heard promptly call up and join the memory-pictures in our mind, and the result must be a new, composite sound-picture, a compromise between the old and the new. However, the act of speaking causes a steady change of speech in still another way. While the mutual influence of the different speech-varieties upon each other might be expected to finally lead to some agreement, a source of incessant transitions lies in the fact, that no one, not even the best trained speaker, reaches absolute perfection, so as to make his own pronunciation invariably and entirely harmonize with the sound-picture in his own mind. Nor is the hearer always in a position to receive the spoken sounds exactly as they were uttered. Both our sense of hearing and especially the nerve-muscle apparatus of our vocal organs are unfit for absolute accuracy; on its

complicated way from mind to mind, the speaker's sound-picture is liable to be reproduced in a somewhat altered form in the hearer's mind, there modifying again the memory-picture and even its own prototype, for, of course, the speaker himself is at the same time hearer also.

If then a slow but incessant change is possible and unavoidable, the question arises in which direction does the change take place and which are the directive factors that determine its course? Historical philology shows the fact that gradual transitions of sounds take place in all possible directions, that no general principle can be stated which would enable us to predict what any individual sound or sound-group will become in the future. We can only register historical facts and from these we may try to draw our conclusions as to their causes. Several reasons have been justly quoted which may account for the direction of sound-change in a general way. On the one hand the element of euphony, vague and subjective as it may be, must yet be recognized as an agent that will influence the production of sounds; of course we are speaking of the unconscious preference for some shade of sound that may be more sympathetic than another. On the other hand, and equally unconscious, the motive of ease, of economy of energy, is at work shaping the pronunciation of our words. But while both these factors, the acoustic element of euphony and the genetic motive of ease, may underlie all phonetic change in general, they yield, for that very reason, quite unsatisfactory explanations of any one individual transition. The question still remains, why is it that these same causes lead to a certain result in one case, while at another time they produce just the opposite effect? Some scholars¹ ascribe a determining influ-

¹Scherer, Osthoff, Kauffmann. Very different from their theories is the fact which Sievers first discovered, that the ordinary position of the organs of speech—"Indifferenzlage"—and therefore the basis of articulation is a different one in the speakers of different languages. How far this is due to racial differences or to the influence of the languages themselves, remains to be decided. My own observation leads me to believe that it is not only the cause but mainly the result of speech-peculiarities.

ence to descent, race differences, or to climatic conditions, or to historical events; and undoubtedly it must be granted that everything that influences speaking man physiologically or psychologically must modify his speech in a certain way. However, it must also be confessed that as yet nothing is known in general or in detail about the *direction* in which these factors may tend to affect language. Much has been said about the soft and musical sounds of the South as compared with the harsh, rough Northern type, but, as Whitney has rightly stated, no concrete illustrations can be quoted that could not be counterbalanced by as many examples which would seem to prove the opposite. Important as may be the effects of these agencies, they seem to be hopelessly covered up by the cross influence of other factors which lead to more immediate results. They are on the one hand, it may well be presumed, largely interfered with by the personal qualities of the individual speaker, by his private condition of life, his habits, his general character. Probably the poor people, the laboring classes all over the globe, have more features in common that are liable to modify their speech, than all the members of any one nation or race, and so have the people who lead sedentary lives, and so the old, and the young, the men, and the women. This consideration shows how difficult it will forever be, to distinguish any traces of racial, historical, climatic influences within this diversified mass of individual cross influences. The difficulty seems to grow into an impossibility, when we remember that a safe standard for comparison is not at our disposal, because no two languages or dialects possess the same speech-material. Moreover, and this is of very great importance, the influences of all the agencies mentioned are superseded by that of speech-intercourse. It is pre-eminently the speech-community which moulds the individual's language. But first it may be well to call to mind what a speech-community is. Accurately speaking, the individual's speech-community comprises all those and only those people with whom the individual actually associates, whose language he hears.

And it is clear that this means something different in the case of every person. On the other hand, it is evident that all these speech-circles are more or less closely interwoven with each other and act upon the individual directly or indirectly. This all-controlling influence manifests itself in a double way : persons will speak the same language in proportion as they grow up and live with each other in an evenly intimate intercourse. If the Negro, the Irishman, Frenchman, German in America, the Jew in Germany, is promptly recognized by his peculiar brogue, it is mainly because he associates more with people of his own kind proportionately than with the public at large. On the other hand a community entirely homogeneous, and of course, subject to the same climatic conditions, will yet develop within itself several speech-varieties in proportion as social groupings exist whose members associate more intimately with each other than with persons of other groups ; and it is not in such cases the general nature of the speaker that causes him to belong to the one or the other language-group, but as he changes over from one social circle into another, he will unconsciously adopt the speech of the new circle ; in fact the same person may acquire the peculiarities of several language-circles, that means, he may speak several similar, yet noticeably differing languages and use them in accordance with the suggestions of the momentary situation. Such facts prove in a general way the predominating power of speech-intercourse. Yet it may be questioned just how far and why the latter succeeds in overruling individual speech-tendencies. The sound-pictures in the memory of every individual are of course nothing but the results, the composite-images of all the sounds which the individual has ever heard, with a strong predominance of those heard last. So the language of the whole speech-community is directly or indirectly the parent and prototype of the individual's language. But we must remember that the individual speaker himself is not only a member of that very community, but on the average every single person hears his own language as much as that of all the other people

put together, and every single pronunciation of a word modifies not only the sound-picture in the speaker's own mind, but also his sensations of motion. These two facts, the double reaction of the speaker's own language upon itself and its numerical preponderance over any other speech-variety would strongly favor the development of individual peculiarities. Yet this tendency is very successfully checked through other agencies which are rooted in the very nature of human language. The latter is distinctly a means not only of expression but, and much more, of intercommunication. It develops out of social necessities and instincts, of a certain sympathy between hearer and speaker. The willingness on the part of the former to listen, to understand, and to react, offers to the latter the main encouragement to speak, as Wegener has well expounded in his book mentioned above. And similarly the act of speaking presupposes a desire to make the listener understand. Out of this mutual relation grows the tendency to adapt one's own language to that of the speech-community, so that not only some crude expression but as perfect a mutual understanding as possible may be obtained, and all hesitancy or partial misunderstanding, all loss of time or energy may be avoided. This is the uniting and at the same time the main conservative factor in Speech, for the result is, of course, not only an increased attention and readiness to apperceive the sound-pictures of others, but also a tendency, in one's own pronunciation, to reproduce as exactly as possible the sound-pictures thus received; to be sure the success is only relatively complete; no two individuals have absolutely the same pronunciation and no language is absolutely stable. While in this struggle of uniting and conservative against differentiating and modifying elements it is impossible in a single case to determine the work of either of them, some general conclusions may nevertheless be drawn from what has been said so far: when every one unconsciously tends to hear and pronounce as well as he can, the personal deviation will be reduced to as little as possible. What remains is the unavoidable result of the individual's

physiological and psychological short-comings. Now the right sensation of motion will naturally be most distinctly acquired and the sound-picture most exactly perceived by the most refined, the most social, and the best-trained speaker. The latter, however, the sound-picture, will also depend upon the character of the community: when the parent prototype, i. e. all the various sounds heard, do not differ much from each other, then the composite sight-picture in the individual will be very distinct and precise. In proportion as the parent pictures were heterogeneous, the composite result will be vague, and admit and be suggestive of different shades and varieties. This will in turn leave the innervation without strict direction and allow more deviation. It is evident, then, that in an exclusive, homogeneous, highly developed and very social community the standard of pronunciation will be strict, uncompromising, and the same will be longer preserved; in proportion as the community extends, as it is heterogeneous, as coarser elements prevail and speech intercourse is less intimate, language will become more diversified, and it will be also more susceptible of change. In reality, the net-work of speech intercourse among men is very unevenly woven; all kinds of influences, social, financial, religious, political, national, geographical, are apt to divide people into more or less exclusive groups. In each of these a different sum total of individual tendencies prevails, and manifests itself in different shades of speech; as the uniting influence of mutual intercourse decreases, these shades between whole groups may accumulate and result in the formation of distinctly different dialects.

We now return to the more special study of Language in the individual and to the question—which are the factors that determine the direction of sound-change? We saw that from the point of view of the subject, the speaker, nothing definite can be said; it is impossible as yet, to discover any trace of climatic, racial, historical influences. Somewhat better results are obtained when the object, the speech-material itself is considered. Upon the basis of the physiological genesis of

sounds a classification of sound changes can be made and this fact would at once suggest that there must indeed be a causal connection between the conditions of the sounds and their changes. There is, first of all, the most distinct and universal influence which emphasis exercises upon the fate of speech-sounds. Accented syllables develop everywhere in a way different from unaccented ones, the latter being more subject to assimilations, or to shortening. Within the various languages historical philology further reveals the fact—which was already stated above—that sound-change usually affects not individual words, but modifies whole groups of words in one and the same direction, and generally the province of a sound-change can be defined by describing the physiological nature and conditions of the equally modified sounds. Sometimes, Phonetics will even, together with the process of the change, disclose also its reasons: the organs of speech, subject to general laws of gravity and perseverance, or owing to psychological impulses which resulted from the situation, had a tendency to deviate from their former lines of motion in a certain direction and thus effectuated the sound-change under observation.

It is in these cases a most natural thing that such a deviation should have occurred not only in one individual but in many persons at the same time, and that the change should have spread and manifested itself in the language of the community. In many other cases, however, the conditions of the sounds that are comprised in one parallel change are not at all equal or similar among each other; sounds will undergo the same change in words in which they occur under noticeably different physiological circumstances, only one of which, and sometimes none, can well be held mechanically responsible for the change. For instance, vowels will change at the beginning or end into a more palatal or velar shade before and after all kinds of consonants, when indeed the on and off glide must be expected to depend upon the nature of the neighboring sounds. What can it be that holds these variegated cases

together and forces them all into parallel changes? Paul says, it is the one innervation, the one sensation of motion which regulates the pronunciation of the sound-element concerned in all the words in which it occurs; whenever through a deviation in any one word the innervation is modified, the pronunciation of the same sound in all other words is regulated by that modified innervation. This explanation seems indeed quite satisfactory in the case of all those changes which affect a sound under substantially equal conditions, so that the unconscious articulation in all words concerned may well be supposed to respond to one and the same innervation. This, however, is far from being the case everywhere, and the argument does not hold good, when the physiological genesis of the sounds is so different, that not only scientific phonetics, but even untrained, everyday observation shows a marked multiplicity of articulations. Moreover, while it must be granted that the sensation of motion, especially when fairly developed, is indeed an important unifying factor, it is at the same time apparent that the superior regulative power lies not in the innervation but in the sound-picture. The reproduction of the sound-picture is the sole aim of the innervation; and a sensation of motion is entirely free to vary, only in so far as it does not tend to alter the sound-picture but to reproduce it more accurately; when it oversteps the limits allowed by the sound-picture, the overwhelming power of the speech-community exercises, through the medium of the sound-picture, a checking, conservative influence, and what little change a deviating innervation may succeed in causing in the sound-picture, will henceforth determine the development of all the several innervations whose results it comprises. Namely, it is a fact—better known at present than it was to Paul—that different articulations may lead to the same acoustic result, that the various organs of speech may vicariously act for each other and yet produce practically the same sound. It is also a psychological fact that our sense of hearing is particularly dull; the average man is pre-eminently eye-minded. Yet even

with the keener sense of sight we are unable to notice the gradual daily changes of our friends as they grow into manhood or old age. It is not astonishing, then, that with the more obtuse sense of hearing we should not perceive the difference between the results of various, similar articulations; that means, that one and the same sound-picture in our mind may allow its orders to be carried out by various innervations in accordance with the different surroundings. All this leads us to look for the main uniting element of all sound-change not in the sensation of motion, but in the sound-picture. Of course, as the result of an especially deviating, individual pronunciation, any innervation, and also any sound-picture, may split in two, or rather the deviation may start a distinctly different impression. Under favorable conditions this division may be concurred in by the speech-community, in every sense of that word; and then we state, in the historical study of results, the effects of two phonetic laws governing, each within its own physiological and geographical limits, the same group of sound varieties which so far had responded all to one single law. Similarly two different innervations or sound-pictures may become more and more alike and finally merge into each other. Thus Old Latin *ē* and *ɣ* unite in later Latin in a medium sound, close *e*, short or long, according to its position in the syllable; then, however, this *e* differentiates again, and for instance, in open syllables becomes *ei*: *oi*, or *ei*: *ɛ*, or *i*, under various conditions. In A. S. both *ā* before nasal, and *ō* coincide in *ō*; then this *ō* splits into *ō* and *œ*: *ē*. Aryan *oi* and *ai* both appear as *ai* in Germanic, and this again splits in some Germanic dialects; in O. H. G. it is *ē* before *r*, *h*, *w* and final, otherwise *ei*; in Old Norse it is differentiated largely after the same fashion. The phonology of all languages abounds in examples.

We see, then, that the *impulse* to change lies in the individual pronunciation and, through it, in the innervation, but we also understand why it is that phoneticians are so often unable to give a plausible physiological reason for a certain

sound-change, and why with the best of phonetics we shall never be able to predict any sound-change. It is not the phonetic conditions of a sound in any one word or position that direct the transition; the innervation is not allowed to change in accordance with its own physiological motives exclusively; but the individual innervation is, together with possibly several other sensations of motion, checked and controlled by one sound-picture and in the final change of the sound-picture we have either the result of the composite tendencies of all the innervations concerned, or else, at best, the outgrowth of some one tendency which for some reason had a predominating influence on the whole group. To this explanation the same objection might be offered which has been raised against Paul's theory; namely, it has been doubted whether indeed one and the same innervation regulates the pronunciation of a sound-element in various words. This objection, if it be any, is untenable. Paul's theory has in its favor not only, as has been said, the probability of a plausible *a posteriori* explanation, but it is supported by clinical experience as well as by general psychological arguments. It is a fact of common medical observation that a lesion of the brain may destroy or impair the ability to pronounce some certain sound or sound-group. And when thus either the sound-picture or the necessary sensation of motion, or only the correct coordinative regulation of the different motions implied, is lost, the respective sounds will drop out or suffer mutilation in all words in which they would normally occur. From the point of view of psychology, on the other hand, the explanation here adopted is apparently included in the theory of apperception and association, and only those can consistently object to it, as to almost everything else here proffered, who are not ready to accept the association theory itself. Our discussion thus leads us in a somewhat different way to the same result which Paul obtained—to the law-theory. For, as we see it now, it is not a number of individual sounds in so many

words which change, but it is one sound-picture entering into the formation of so many word-pictures, that changes.

The fact that the process may be at any time interrupted and cut short in individual words, when the latter undergo the influence of other factors, does of course not in the least alter the psychological aspect of the matter. Nor does it diminish the importance of the law-theory either from a philological or from a psychological stand-point. A few hints may here suffice: upon the law-theory depends, in historical philology our decision as to the causes of innumerable deviations from what seems to be the normal development of sounds; while psychology may hope some day, when both the genesis and the acoustics of sounds will be better understood, to ascertain from the historical sound-change the exact extent of individual sound-varieties that may be apperceived into one sound-picture.

We need to add but little to explain the nature of Analogy. As apperception is related to association—see page 319—, so Phonetic Law is related to Analogy. The underlying motive is the same, but the materials and consequently the results are different. Phonetic Law is based upon the union of practically equal sounds into one and the same sound-picture; this involves sameness of fate. Analogy rests upon the association between different sound-pictures or word-pictures which have something in common with each other. Here, then, the equal uniting parts alone are apperceived into the same memory-picture, while the remainders of the larger, more complex speech-units form each an impression of its own. For instance, there are no two suffixes or words in any language which resemble each other so much in form and in meaning as the *o* in *bone* resembles the *o* in *stone* and which, therefore, could be reflected by one single picture in our memory. Each prefix, suffix, ending, word, has in our mind a representative, a memory-picture of its own, and this composite picture comprises the various occurrences of the prefix in different words, or of the word in different sentences, as one and the same sound-picture covers

the corresponding sounds as they enter into the formation of various words. All the different memory-pictures, however, are, directly or indirectly, connected with each other by some similarity, and in proportion as they are equal, must a change of one affect the others also. Now the degree of similarity varies greatly, and again, one and the same element of equality may be common to a larger or smaller number of more complex organisms. Thus, groups are formed on the basis of the element of equality, and, as is natural in the manifold interrelations between diverse complicated units, the various associations may conflict with each other in their influence upon the speech-material. We will first consider the simplest kind of analogy, namely, that between the different innervations and sound-pictures.

The innervations and sound-pictures which, so far, we have treated as units, are at the same time of a complex nature. Every sensation of motion necessary to produce a speech-sound, governs the movement of all the organs of the vocal apparatus individually and also regulates the correct coordination of these movements; and on the other hand, every sound-picture comprises the results of complicated vibrations. Now, various innervations may and actually do resemble each other in some features, and every particle which any two or more sound-innervations have in common, is of course the identical innervation of its own wherever it occurs; a change which affects it, must modify all the sound-innervations concerned in a parallel manner; and so with sound-pictures. There can be no doubt that this *phonetic analogy*, or better perhaps this *anaphony*,¹ is the main source of the peculiar harmony of sounds and sound-changes which—as Sievers first observed—shows itself within individual languages. The other source is probably to be found in the common basis of articulation, the result of the sum total of the individual's speech peculiari-

¹ We suggest the word "anaphony" for this phenomenon, in order that the expression "phonetic analogy" may be reserved for those interrelations between *word-elements* which are based upon equality of sounds.

ties. Thus we understand the unmistakable parallelism of the various sound changes comprised under the name of Grimm's Law, or the development of voiceless final consonants in Gothic, Old Norse, or Old High German; the unrounding of palatalized vowels in German dialects; the far-reaching phenomenon of *i* and *u*-umlaut in Germanics; the opening and vocalizing—"das Stimmhaftwerden"—of intervocal Latin consonants, or the higher off-glide of long, narrow vowels— \bar{o} : *ou*, \bar{e} : *ei*—and the higher on-glide of the corresponding wide vowels— \bar{o} : *uo*, \bar{e} : *ie*—in Old French; in short, all those larger movements which modern phonology more and more clearly recognizes.

In the interrelations between larger speech-elements—syllables, words, sentences—exactly the same motives are at work. In order to recognize this fact it is above all necessary to avoid a mistake which is apt to beset the mind of the philologist whose attention is directed principally towards *changes* of word-forms. The student of historical phonology finds the word analogy particularly applied to words, which show an irregularity in their phonetic development. Formerly these word-forms were attributed to *false analogy*, and that expression—while it seems to ascribe an undue superiority to forms sanctioned by usage—had at least the advantage of clearly indicating to the beginner, that there is also such a thing as *legitimate* analogy at work in Language. To be sure it was this very idea, that an analogy was never a false one in itself, which caused Paul and others to protest against the odious adjective.

However, as the word analogy seems, in the minds of many, to imply the idea of something irregular, exceptional, it may be well to emphasize the fact that Analogy is the main constitutive factor in linguistic morphology and in syntax. To it are due our systems of declension, conjugation, comparison, etc.; without it the individual would be strictly limited to the mechanical reproduction of such word-forms, as he has actually heard, while through analogy we are able to form new words which we never heard, by combining known elements after

the pattern of other known combinations; by analogy we speak in sentences. When the child has heard some comparatives ending in *-er* as against some positives without that ending, a memory-picture is unconsciously formed containing the sound group *-er*, as the ending of an adjective, connected with the idea of comparative. This memory-picture presents itself, whenever either of its parts is touched upon; the ending *-er* is added to adjectives when the idea of comparative agitates the mind, and *vice versa*. Similarly, after having heard and understood the structure of a more complicated statement, a sentence, the mind connects the logical categories and the interrelations of the same with their expressions in language forms; memory-pictures of these interrelations are developed which will henceforth regulate the structure of sentences equally proportioned. Just as in reading a word which we never heard our memory-pictures of sound and of innervation enable us to pronounce the individual sounds. This will illustrate the fact that analogy is not essentially different from Phonetic Law, so far as the mental process is concerned: some certain speech-element occurs repeatedly in the spoken language within larger speech-units; its individual occurrences—though slightly differing from each other—form in our mind one composite impression, one memory-picture, which regulates them all, but is in turn apt to be modified by every new utterance of the respective element. The result is a peculiar harmony in the phonology and morphology of individual languages.

What tends to obfuscate in our mind this identity of process, is the fact that analogy, so called, works with much more complex organisms, and quite especially the fact that in Phonetic Law we speak of equal elements—speech-sounds—alone, as whole units, while in analogy we treat the much more complicated elements of equality as merely parts of other units, for example, we compare words when their suffix alone is the same, and from the point of view of these larger units we can of course only state similarity, association, whereas in Phonetic Law we speak of the equal elements and state

apperception into the same memory-picture. This may be of advantage from a descriptive point of view, but it is inconsistent. Speech sounds are no more or less units of their own, to be studied by themselves, than are prefixes, endings, words, logical categories and their inter-relations. When this is kept in mind, the fundamental identity between the two phenomena will appear clearly.

The question now arises, why should the study of results, historical philology, reveal so many cases of exceptions to this general harmony? Why should analogy and phonetic law ever counteract each other, when they are indeed manifestations of the same mental process? The answer is this: sound-pictures are on the one hand connected with ideas; they enter into larger, complex units which comprise form and meaning; for example, the suffix *-er*, as we saw above, combines with the idea of comparative, we develop the memory-picture: (idea of comparative and suffix *-er*). On the other hand, however, sound-pictures are the results of articulations, and the latter, with their sensations of motion, undergo unavoidable changes in accordance with the underlying phonetic conditions. Thus a sound will change into a certain other sound under some conditions, while under other circumstances it is modified differently. Now it may and does happen, that one and the same sound in the same word or word-element—that is, connected with the same meaning—occurs under different phonetic conditions, according to accent and surroundings, and thus is subject to various sound-changes. In many English dialects, for instance, *r* remains before vowels, while before consonants and in pause it disappears. This sound-change which turns *bird* into *bæd*, while it leaves *America* intact, affects our suffix *-er* in both ways; before words beginning with a vowel it is *-er*, or rather *-ər*, before consonants and in pause it becomes *-ə*. Both suffixes are equivalent in meaning; both connect with the idea of the comparative, and instead of the former unit we have now two sensations; (idea of comparative + suffix *-ər*) and (idea of comparative + suffix *ə*).

In case the idea of the comparative now agitates the mind of a speaker, which of these two memory-pictures will present itself? the one with *-ər* or the one containing *-ə*? Of course, in the minds of the persons in whom the change, the real transition¹ originally took place, the sensation of motion coupled with the sound-picture regulates the pronunciation in accordance with the phonetic conditions; but, the change having once become a fact, the original conditions are no longer in every single speaker again and again the source of the same change; those conditions may no longer exist, but the result, that there are now two sounds where formerly there used to be one, remains, perpetuated through the transmission of two ready-made sound-pictures to every new hearer. These two sounds are perceived successively, as they occur in the language: the child hears *bæd*, and it hears *America*, but it may hear comparatives ending in *-ər* and in *-ə*. We suppose for the sake of illustration, that the *ə*-variety should have first presented itself, alone or in overwhelming majority; then it alone will form a distinct memory-picture and the sensation: (idea of comparative + suffix *-ə*) will cause the child to form new comparatives in *-ə*, regardless of the following sound. Of course, a man who only knows the comparative ending *-ə*, can only say *betə is betə*; he could not before *is* insert an *r* any more than any other consonant.

Later, however, both suffixes, *-ə* and *-ər*, are introduced again and again and some sort of discrimination will develop. The latter may be more or less correct, that is, in accordance with the original state of affairs; from incomplete materials, unevenly introduced, of course, no just criterion can be derived. Perhaps a vast majority of forms in *-ər*, or the fact that these forms were more intensely apperceived, may create the sensation that *-ər* is altogether preferable and the result would now be: *betər is betər*.

¹ We would here quite especially refer to Paul who first established this very important distinction between change and interchange of sounds—"Lautwandel" and "Lautwechsel."

Gradually, however, the correct sensation as to the proportion between the suffixes and their phonetic conditions develops and the man now says : *betər is betə*, in accordance with the original sources of both varieties. The sensation of this proportion may even, then, affect words which do not originally belong to this category, having etymologically the suffix *-ə* exclusively, the proportion "suffix *-ə* : following consonant = suffix *-ər* : following vowel" may produce a result : *the idea was* = *the idear—is*. But even, when the right sensation of the alternation between *-ər* and *-ə* is already developed, either one of the suffixes may at times be so predominant that the respective memory-picture presents itself with more ease than the sensation of proportion, and the result may be a form which from the descriptive point of view is called an exception.

This, then, is the nature of the struggle that may arise between Phonetic Law and Analogy and we see plainly how there can be a variety of results coming from a perfectly consistent working of the same psychological motives, when the speech-material varies that is acquired by the speaker and can alone be active in him.

We refrain from going into further detail, as Paul in his *Principien* and more fully Wheeler in his excellent monograph have attended to the subject of Analogy so thoroughly that we have nothing new to add.

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